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L6: Entry 4 of 49

File: PGPB

Nov 22, 2001

DOCUMENT-IDENTIFIER: US 20010044676 A1
TITLE: INTERFACE ENGINE FOR MANAGING BUSINESS PROCESSES WITHIN A MULTIMEDIA
COMMUNICATION-CENTER

Application Filing Date:
19981029

Summary of Invention Paragraph:

[0012] In addition to Internet protocol (IPNT) calls, a DNT center may also share other forms of media with customers accessing the system through their computers. E-mails, Video mails, fax, file share, file transfer, video calls, and so forth are some of the other forms of media which may be used. This capability of handling varied media leads to the term multimedia communications center. A multimedia communications center may be a combination CTI and DNT center, or may be a DNT center capable of receiving COST calls and converting them to a digital DNT format. The term communication center will replace the term call center hereinafter in this specification when referring to multimedia capabilities.

Summary of Invention Paragraph:

[0016] With many new communication products supporting various media types available to businesses and customers, a communication center must add significant application software to accommodate the diversity. For example, e-mail programs have differing parameters than do IP applications. IP applications are different regarding protocol than COST calls, and so on. Separate routing systems and/or software components are needed for routing e-mails, IP calls, COST calls, file sharing, etc. Agents must then be trained in the use of a variety of applications supporting the different types of media.

Detail Description Paragraph:

[0045] Incoming DNT calls, and other communication events such as e-mail, file transfers and the like, arrive at a routing node 21 in WAN 15 and are passed on over digital connection 25 to a routing server 29 within communication center 17. Once calls arrive at server 29, they may, in some embodiments, be routed directly over LAN 55 according to existing routing rules to personal computer/video display units (PC/VDU) such as PC/VDU 39, 41, 43, or 45 located at agent's workstations 31, 33, 35, and 37 respectively.

Detail Description Paragraph:

[0051] In a preferred embodiment of the present invention, a customer-interaction network operating system, hereinafter termed (CINOS), is provided for the purpose of managing communications center 17, and optimizing and recording all agent/customer interactions received at communication center 17 from networks 13 and 15. CINOS is unique in the fact that it is a multi-tiered object-and process-orientated system wherein logic regarding the various aspects of it's functionality is achieved via knowledge-based architecture and object modeling. Various functions of CINOS, more fully described below, include capturing (recording), analyzing, routing, and, in many instances, responding via automated process to customers engaged in interactions with the enterprise (company hosting the communication center). CINOS is adapted to support all planned communication mediums such as

multimedia DNT applications including e-mail, video mail, file transfers, chat sessions, IP calls, and CTI COST transactions such as voice calls, voice mails, faxes, and so on.

Detail Description Paragraph:

[0056] Once a call or other communication event registers at either switch 27 or routing server 29, CINOS immediately identifies the media type associated with the call and begins its processes depending on enterprise rules. For example, a live COST call may first be routed to IVR 69 whereby the customer can be presented with varying choices such as leaving a voice message, waiting in queue, receiving a call back, or perhaps an e-mail, and so on. Interaction by IVR 69, in this instance, will preferably be via voice recognition technique such as is known in the art, but may also be via touch tone response or other known method. As previously described, the caller may elect from a number of options, such as to hold for a next available agent, select an automated response such as a fax back, or perhaps a later agent-initiated response such as an e-mail or call back. In all cases, CINOS seamlessly processes and executes the logic required to accomplish the goal of the caller in a media and application-independent fashion.

Detail Description Paragraph:

[0058] All interactions with live external media, including actual text-based events whether live or not, are recorded and stored in MIS 79 with an associated text version of the media stored as well, and becoming part of an overall threaded contact history. This is accomplished in varying ways according to existing parameters such as media type, whether the event is a live call, and so on. For example, CINOS may execute a command directing IVR 69 to digitally record an incoming COST call during customer interaction and then store the voice recording of the transaction in MIS 79. A text version of the recording either created simultaneously from the voice recording via voice-to-text techniques (known in the art), or created by a live attendant via manual annotation may be sent to and stored in DB 79. An IPNT call arriving at routing server 29 may be similarly recorded and stored in MIS 79 with an associated text version of the interaction stored in DB 79. E-mails, video calls, voice mails and so on are similarly handled. For example, an incoming e-mail is stored in MIS server 79 while text from the e-mail may be extracted and stored associated with the e-mail.

Detail Description Paragraph:

[0060] It is important to note here that the text-based version of an event may or may not be a complete and verbatim rendition of an actual media event. For example, an e-mail may contain many documents each having many pages of text. Therefore, the text-based version of a particular e-mail event may simply contain the name and particulars regarding the author, a purchase order, and a list of the enclosed documents by title, and basic content or memo as well as a possible manual annotation. The attachments to the e-mail may be stored separately, and be also cross-indexed and retrievable. Seeing the purchase order when the event is routed to an agent desktop tells the agent that this e-mail is important.

Detail Description Paragraph:

[0063] After incoming events are analyzed and processed with regards to queuing, recording, storing, etc. CINOS decides the disposition paths of each event. For example, live calls in queue are routed to live agents if available, if this is the priority action in the enterprise rules. E-mails are either routed to next available agents using a push technology, or simply stored in MIS server 79 where they may be retrieved by agents after receiving notification. Recorded events such as IVR voice requests are stored in MIS server 79 where they may be retrieved by agents, and so on.

Detail Description Paragraph:

[0069] An additional set of models handle how agents receive their routed media such as via traditional push model, blended push model, publish and subscribe

model, or interrupt model. Prioritizing interaction events may also be accomplished through varying the push theme or scheme. For example, traditional push technology for e-mail means that only e-mail (media type) is being worked on by an agent. By blending the push model with a publish and subscribe model, the interrupt model is created wherein the agent may subscribe to various routed media such as answering phones, and responding to faxes, but may be interrupted for an important interaction of another media type such as e-mail and so on. In this way an agent's time may be utilized according to enterprise rules within an automated environment.

Detail Description Paragraph:

[0070] Outbound campaigns may be configured according to enterprise rules and media preference using a single rule-set knowledge-base. This single set of outbound tools can be used to initiate customer dialog via predictive dialing, e-mail push, automated recorded messages, and so on.

Detail Description Paragraph:

[0076] Workflow layer 85 comprises 3 basic function categories beginning with a content analysis category 89 wherein textual analysis, voice analysis, IVR interaction, recording and storing takes place. A next category is context resolution 91. Context resolution involves customer identification, business process binding, preparation for routing, and so on. A third category termed interaction routing 93 comprises various processes associated with the presentation of the interaction to agents, service persons, knowledge workers, business partners, customers and the like, that is, all transaction partners. Category 93 covers queuing, skill-based routing, automated treatment, workflow models, and so on.

Detail Description Paragraph:

[0080] FIG. 3 is a flow chart illustrating basic steps performed by the interaction operating system of FIG. 2 related to completing a transaction between a customer and an agent, wherein the transaction is initiated by the customer. Similar steps may be accomplished in the opposite direction for communications initiated by an agent, as the system is bi-directional, but the present example will serve to teach the inventive aspects of the system. In step 95, an incoming transaction, such as a live call, an e-mail, etc., is received at the appropriate CTI switch (COST) or routing server (DNT) in a Cynos communication center such as center 17. In step 97, customer and media type are identified and interaction proceeds.

Detail Description Paragraph:

[0081] All transactions, whether live calls, such as video calls, DNT calls and COST calls, or text-based documents, such as e-mails, are recorded and stored in one or more mass storage devices handled by one or more database applications. This may be taken as server 79 of FIG. 1, although the diagram of FIG. 1 is exemplary.

Detail Description Paragraph:

[0084] If the media chosen by the customer is determined in step 99 to be a live interaction such as a COST or IPNT call, then the existing knowledge base is accessed at step 107, and the call is routed to the best fit agent. This may, of course, be done in a number of ways, such as an ADC, skill-based routing as known to the inventors, transfer to an IVR for automatic processing, and so on, as may be dictated by enterprise rules. If routing is to an agent, customer information may be retrieved from CIS server 57 (FIG. 1) and sent to the agent's PC, and appropriate scripts may be provided to guide an agent in interacting with the caller.

Detail Description Paragraph:

[0093] A business-logic layer comprises business object models 129, hereinafter termed business objects 129, representing contacts, interactions, knowledge-bases, events, routing processes, and other system routines. Integration and interaction

of the various described desktop components with these logics is accomplished via common object modeling (COM) which is known in the art and available to the inventor. Desktop to CTI integration is accomplished via controls provided or created with a CTI set of tools or tool kit (not shown). For example, if the enterprise desires to blend voice and e-mail, the CTI tool kit would be used to build and integrate the interface.

Detail Description Paragraph:

[0105] To further illustrate, refer now to new client section 135. If window 133 is part of the enterprise WEB page, as is the case with this example, there will be a variety of visitors which may or may not be pre-qualified by the enterprise. Therefore, an interested party would begin (and be restricted to) taking a new client survey, illustrated as one of the options in section 135. If the enterprise rules require this as a first step, then the other options may be enabled only upon completion of the survey. By choosing new client survey, a second window may contain various survey options such as via e-mail, interactive voice recording, type and send method, or the like.

Detail Description Paragraph:

[0108] Section 137 presents media options for clients seeking customer service from the enterprise. These options are, in a preferred embodiment, presented in a customized or personalized fashion within the client's window 133 as was described above. Therefore, each client patronizing the enterprise may access a version of window 133 that differs in look and functionality than that of another client. In this example, service section 137 contains options for e-mail, chat program, fax program, a self-help wizard, and a voice wizard. Other media types may be added or subtracted from the client's window 133 depending on any of several criteria. Personalization of window 133 takes into account client information as stored in CINOS database 75, service-agent media availability and preferences, and perhaps any overriding enterprise rules. Unless and until a client is identified there are typically no options presented to the client for continuing a transaction with the enterprise.

Detail Description Paragraph:

[0109] For an identified client, by selecting the e-mail option, the client's preferred e-mail program may be activated for the purpose of sending a message to or soliciting a reply from a service agent. By selecting chat program, the client may be launched into a scheduled service seminar featuring many clients interacting with a service expert regarding a certain subject. One enterprise rule regarding section 137 may be that there is no telephone or I-phone media option for customer service for a client in the absence of an ongoing project with the particular customer. In this sense an ongoing project includes any unfinished business that the client is involved in with the enterprise.

Detail Description Paragraph:

[0114] Certain media options, as described above, may be afforded a certain priority over one another regarding interaction with the enterprise. For example, a VIP client may have live interactive media choices offered in window 133 such as I-phone, call back to COST phone, video phone, etc. A client known for infrequent contact or troublesome interactive history may be limited to text-based interaction such as e-mail and so on.

Detail Description Paragraph:

[0136] Manual transcription may also be used to convert audio/video to text or code that may then be entered into text section 191. For example, a live attendant 201 is shown connected to LAN 195. Attendant 201, in this case, may be given the responsibility of transcribing audio files from speech to text and annotating video or graphics files for the purpose of creating text files related to the non-text data. One or more live attendants such as attendant 201 may be provided for this purpose. Some media arriving at a communication center such as the one represented

via architecture 171 will already be text-based and therefore require no conversion or annotation. Short e-mails, Faxes, word documents, and so on are part of this media category.

Detail Description Paragraph:

[0137] An automated services system 193 is illustrated as having a direct connection to section 191 of the data repository. System 193 is provided for certain text-based interactions, as described above, wherein a complete text record of the interaction may be mirrored, or otherwise created and stored into text section 191. Such automated services may include but are not limited to automated e-mail and fax systems. For example, a fax may be sent and mirrored into section 191 or, perhaps recreated using an optical character recognition (OCR) technique and then entered. Physical text-documents such as legal papers and the like, may be automatically scanned into text section 191 before they are sent to clients. There are many possible automated techniques for entering text files into a database. Such methods described with regards to automated services 193 are a convenience in practicing the present invention but are not specifically required to achieve the objects of the present invention.

Detail Description Paragraph:

[0148] A series of icons a-d represent the type of media stored for each text block (text not shown). For example, issue I comprises first an e-mail text followed by a fax text, WEB text, and V-phone text. In this case, a time stamp or other known method may be used to insure that each text block is in order. Icons a-d are interactive pointers or links to the actual media interactions that they represent. That is, the first block of e-mail text is associated with an interactive icon, in this case icon a. By clicking on icon a with a pointer device, the actual e-mail may be accessed and viewed. In an alternative aspect, not only the actual transaction may be presented to a user for review, but related files may also be listed or otherwise presented for selection and review.

Detail Description Paragraph:

[0152] In MIS 189, recorded multimedia interactions are represented by icons I-IV and VI. For example element I represents all recorded Video phone interactions. Element II represents all e-mails. Element III represents all recorded COST interactions. Similar associations are made with respect to elements IV and VI which represent WEB interactions and Video mails respectively. WEB interactions IV may include on-line orders, requests, information forms, signed certificates, and so on.

Detail Description Paragraph:

[0155] Element a represents an e-mail sent by customer 205 to the enterprise requesting pricing information. An enterprise agent responds with a fax (b) to customer 205 containing the requested information. Customer 205 then places an on-line order (element c) along with a request for confirmation via video phone (element d). Issue I may be closed at this point. Issue II may represent a threaded dialog concerning company service with regards to the customer order of issue I, or perhaps an agent-to-manufacturer dialog regarding how the order was handled with respect to issue I.

Detail Description Paragraph:

[0166] Among these functional modules are interactive media viewers (IMV's) 227 which are provided and adapted for viewing certain media supported by the enterprise hosting a communication center employing CINOS. Supported media types may include but are not limited to telephony (traditional or IP), interactive voice response (IVR), e-mails, WEB embedded interfaces or forms, faxes, chat programs, multiparty threaded discussions, etc. IMV's 227 are unique in the fact that they are dedicated viewers including an interactive layer that enables viewing of only pre-selected media as defined by enterprise rules. For example, CINOS users may be assigned an identification code or number which will also be tagged to all of their

stored interactions as described elsewhere above with reference to FIG. 9. These codes may be used to associate individuals with limitations and constraints from viewing media that is not part of their own contact history (for example). Other limitations or constraints may also be applied to IMV's 227 as may be conceived and implemented by a programmer such as playing or viewing interactions of certain dates, playing or viewing interactions about certain subjects, and so on. An editable software layer inherent to each viewer enables a programmer to build such constraints into a particular viewer, and to add the edited viewer to an IMA.

Detail Description Paragraph:

[0179] Although not explicitly shown, each IMV is editable through a software layer. In this way, a user may be limited to viewing certain media interactions and transactions that are allowed via enterprise rules. For example, TXT viewer may only be able to view e-mails from the user and agent in a specific interaction thread, but not intermittent e-mails on the thread that may be from agent to agent or supervisor to agent and so on. Because each interactor with CINOS has an identification, and all interactions from or to them are so identified, these identifiers may be used in the edit layer of each viewer to constrain the user. In this way, a user may be granted access to a history database and view only his interactions without imposing on other users who share the system. Likewise, agents or supervisors charged with the task of reviewing the activities of certain other agents may use applications such as IMA 239, adapted for the stated purpose, and be constrained in terms of whose interactions (agent's) may be viewed, and so on. In this manner full use may be provided to specialized users without exposing otherwise sensitive information that is not pertinent to the user or the purpose of the IMA.

Detail Description Paragraph:

[0180] Operation 243 created to allow a user to place an order for products is, in this case, a logical close for the previous operation. A module labeled Media Options may present standard media choices that the enterprise accepts for placing an order such as IP phone, e-mail, and so on. A connected text module (TXT) allows the user to send a quick text order while on-line. A send button sends a completed order to the enterprise.

Detail Description Paragraph:

[0197] Automated CINOS systems such as systems 255 through 261 are adapted to interact with data stored in repository 263 in order to perform their intended functions related to CINOS operation. For example, CIS 255 uses data in repository 263 for presenting information to agent's at the time of or ahead of a live interaction. AT SYS 257 has to access and process data for generating system audits. RT SYS 259 requires data for intelligent routing purposes. AS SYS 261 uses data to update and configure services such as faxes, e-mails, voice messaging, and the like.

Detail Description Paragraph:

[0229] Column 293 represents a time that each step and sub-step begins executing within the CINOS system. Numerals illustrated in column 293 represent units of time expired as the process is executed. For example, Main task 1 named Pre-Qual begins at 0000 (the time that the application is invoked). A client who is requesting a loan via telephone or other media may invoke IPM 287 thus beginning it's automated execution while the client waits in queue. In some embodiments, wherein a client is not live in queue, an agent may initiate the process based on a not-live request such as an e-mail or fax. In general the time displayed in windows under TIME Begin are returns only, based on the actual times related and previously required steps are completed. That is, typically a task will not begin at a fixed time from 0000, but will begin as soon as pre-requisite tasks are all completed.

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L2: Entry 2 of 88

File: PGPB

Jun 20, 2002

DOCUMENT-IDENTIFIER: US 20020077876 A1

TITLE: Allocation of location-based orders to mobile agents

Application Filing Date:

20001218

Detail Description Paragraph:

[0113] At a conventional call center server, certain skills may be grouped into skillsets and the skillsets internally assigned an electronic identifier. The identifier may then be electronically assigned to an agent having the skills that define the skillset. Skill-Based Routing (SBR) allows call routing based on criteria such as service requirements of a call and the skills of available agents.

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<input type="checkbox"/>	L6	l2 and (E-mail or e-mailing or (electronic adj2 mail))	49
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L7: Entry 12 of 33

File: USPT

Jun 24, 2003

DOCUMENT-IDENTIFIER: US 6584192 B1

TITLE: Method and apparatus for skills-based task routingAbstract Text (1):

An efficient algorithm is presented for selecting an agent to service a task in a skills-based routing system. A set X is determined of all states of the boolean variables that contain the required skills for a task. A resume table of available agents is built, organized by the states of the N variables; each agent is represented in each state that includes all skills possessed by the agent. All available and qualified agents are determined from the resume table; those agents associated with a state of the resume table outside of the set X are disqualified. An agent is selected from those remaining. Preferably, an agent is selected having a minimum qualification level to service the task. One preferred way of doing this is to subtract from the number of terms in a canonical form of the required skills expression a number equal to the number of times the agent appears in the set of states X and picking an agent with the lowest result. In the preferred embodiment, however, proficiency levels of each required skill are taken into account in making the final selection.

Application Filing Date (1):

19991206

Brief Summary Text (4):

There are many known algorithms which have been used to route tasks, such as incoming calls, to agents within a group or groups in call and service centers. Recently, operators have realized the importance of task routing based on the skills of agents as compared to the needs required to adequately service individual tasks. For instance, a telephone caller may require expertise in a particular software or hardware system, or expertise in a particular sector of the financial market, or a specific company. The same is true of a person requesting assistance by e-mail. Further, a caller may speak only a specific language and therefore require an agent fluent in that language. The list of possible skills goes on and on, and are defined by the owners of the individual service centers according to the purposes of the service centers.

Brief Summary Text (5):

U.S. Pat. No. 5,825,869, issued to Brooks et. al. On Oct. 20, 1998, describes a system for skill-based routing of telephone calls. Brooks attempts to select agents whose proficiency in specified skills are closest to the required proficiency levels of one or more required skills. However, Brooks describes no algorithm for actually performing the calculations and logic to make the selection. Therefore, it must be presumed that Brooks performs a brute-force method in which all available agents are evaluated in a straight-forward manner and then the results compared to finally select an agent. Prior versions of IBM's CallPath products performed a similar brute-force manner of agent selection. However, such methods of agent selection are very inefficient, especially for service centers that experience high levels of traffic.

Detailed Description Text (2):

FIG. 1 shows an illustrative agent resume table of skills for an illustrative task center. The task center might receive telephone calls, e-mail, World-Wide-Web (WWW) based inquiries or other types of tasks, including tasks not yet defined. For this example, it is assumed that four skills A, B, C and D are defined for the servicing of tasks. The skills required to service any given task might be obtained from a database accessed by a user identification, or obtained by prompting a caller with questions and collecting answers dialed from a telephone, or perhaps from a WWW form filled in by a user. The table of FIG. 1 lists each agent that possesses each skill. Nine agents identified as A1 through A9 are assumed. For this example the following agent/skill mapping is assumed:

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L7: Entry 13 of 33

File: USPT

Apr 29, 2003

DOCUMENT-IDENTIFIER: US 6556671 B1

TITLE: Fuzzy-logic routing system for call routing with-in communication centers and in other telephony environments

Application Filing Date (1):
20000531

Brief Summary Text (18):

A degree of routing flexibility has more recently been achieved in more advanced intelligent systems known to the inventor through introduction of various "flexible" routing techniques. Among these are skill-based routing, predictive routing, priority routing, statistical routing, virtual queuing, and even knowledge-based routing. These routing techniques are known to the inventor, may be implemented in combination, and are typically server-controlled and executed. In some applications, these flexible rules may be changed for special cases at the time of or before a call reach a final destination. In this way, even more flexibility in routing may be achieved. In some of these systems known to the inventor, profiles are developed for repeat callers so that identification is more complete and special routing routines may be developed and executed based on profiled histories.

Brief Summary Text (25):

In both of the above-described aspects, the communications events may be of forms other than voice calls such as e-mails, faxes, instant messages, or other known forms. In still another aspect the system is adapted for wireless communication wherein the medium of communication is a wireless data network.

Detailed Description Text (12):

Automated systems (A-SYS) are illustrated herein as A-SYS 41, which is responsible for COST automated systems, and A-SYS 43, which is responsible for DNT automated systems. A-SYS 41 is connected to telephony wiring 26 and represents capabilities such as automated call-backs, automated faxes, automated voice messaging, and so on. A-SYS 43 is connected to LAN 35 and represents capabilities such as automated e-mails, automated computer faxes, automated file shares, instant message alerts, and so on.

Detailed Description Text (16):

SW 32 instances illustrated herein enable IVR 27 and IVR 33 to recognize and parse natural language spoken by a customer. Parsed sections are termed needs expressions by the inventor. IVR functionality provided by SW 32 of the present invention may be described as a needs expression tool (NET) for creating needs expressions or instant profiles. Other tools may qualify as needs expression tools. For example, a fax sent in by a customer may be scanned and parsed by a text parser. This system would become a NET for creating instant profiles from a fax or other text communication. There are many such possibilities.

Detailed Description Text (19):

It will be apparent to one with skill in the art that the method and apparatus of the present invention may be practiced in a variety of different ways for different

types of communication media without departing from the spirit and scope of the present invention. The preferred embodiment illustrated herein focuses on creating needs expressions from customer voice interactions using enhanced IVR and natural language parsing capability as a NET. Both COST and IP voice calls are handled in essentially the same manner. Applicable NETs may be created for e-mails, faxes, letters, file requests, and other forms of communication.

Detailed Description Text (20):

It will also be apparent to one with skill in the art that CETs may be developed that incorporate real-time information without departing from the spirit and scope of the present invention. For example, an interactive software application (not shown) may be created that agents may interact with in order to input profile information. Profile information would include basic skills, languages spoken, expertise in lesser known areas, and so on. Administrators or supervisors may then add to or refine the created profiles. While CETs are being held in CETI 37, they may be updated periodically to reflect current assignment, availability, newly acquired skills, and so on.

Detailed Description Text (22):

FIG. 2 is a block diagram illustrating a fuzzy-logic routing process according to a preferred embodiment of the present invention. Software (SW) 69 illustrated herein may, in one embodiment, be analogous to SW 32 illustrated in FIG. 1 running on processor 29 and on IP router 31. This would, of course be in an embodiment exemplifying COST and IP voice callers whom are first interacted with by IVR. However, in another embodiment, SW 69 may be adapted to work with e-mails, faxes, and other communication forms as previously described.

Detailed Description Text (23):

In order to create a needs expression for one COST or DNT interaction, SW 69 must receive a solicited customer input 72. Input 72 may be of the form of an IVR interaction, an interactive text form (DNT), or another medium wherein the customer is first prompted for the nature of his or her request. Input 72 may be of the form of a natural language request, however coded input may also be utilized in some applications. In the example of FIG. 1, the solicitation is accomplished through IVR functionality. In an alternate application such as e-mail, solicitation may not be required, as an e-mail destined to communication center 15 will likely already contain a request that may be parsed and understood.

Detailed Description Text (24):

In the case of IVR functionality, voice recognition is utilized to analyze input 72. This occurs within a needs expression engine (NEE) 71, which is a part of SW 69. NEE 71 is adapted to parse certain portions of input 72 for useful information. Nouns, verbs, part numbers, product titles, adjectives and so on may be recognized by NEE 71 and organized into parsed sets. Using a natural language parsing engine in conjunction with voice recognition software allows NEE to create parsed sets which reflect the customers own words (needs expression). Additional information tagged to each parsed set would identify the caller or originator of input 72 according to methods used in rules-based routing. Parsed sets, also termed needs expressions, are then used as input for a search engine 73 as illustrated by the directional arrow labeled parsed sets.

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L7: Entry 23 of 33

File: USPT

Jul 17, 2001

DOCUMENT-IDENTIFIER: US 6263066 B1

TITLE: Multimedia managing and prioritized queuing system integrated with intelligent routing capability

Abstract Text (1):

A queueing system in a call center is adapted to queue voice mails as well as live telephone calls. In a preferred embodiment the calls include both connection-oriented switched telephony (COST) calls and Data Network Telephony (DNT) calls. Callers are enabled to leave voice mail as an alternative to waiting, and records of the voice mails are queued, preferably in the same queue processing the live calls. In some embodiments the call center is enabled to process e-mails, video mails and facsimile messages as well as live calls and voice mail messages, and all types of multimedia communication can be queued in the same queue according to prestored routing rules and priority rules.

Application Filing Date (1):

19980611

Brief Summary Text (5):

In order to more effectively use telephones for business and marketing purposes, call centers have been developed. In a call center, a relatively large number of agents handle telephone communication with clients. The matching of calls between clients and agents is typically performed by software. A simple example is used here to describe a few of the many advantages of using call centers. When a call is made to a call center, the telephone number of the calling line is typically made available to the call center by a telephone carrier. Based on this telephone number, the software in the call center can access a database to obtain information about the client who has that phone number. The software can then better route the call to an agent who can best handle the call based on predefined criteria (e.g., language skill, knowledge of products the customer bought, etc.). The software also immediately transfers relevant information about the client to a computer screen used by the agent. Thus, the agent can gain valuable information about the customer prior to receiving the call. As a result, the agent can more effectively handle the telephone transaction.

Brief Summary Text (10):

If a client sends an E-mail, Voice mail or another type of multimedia communication, he or she does not want to be overlooked or forgotten on an agent's computer. Rather, the client desires that a timely and professional response will be sent back by the company. This is especially true with company-to-company buying of products or services. A typical buyer has many duties that can be interrupted because of inordinate amounts of time spent waiting to place an order. In these types of situations, idle time costs money, and in many cases, cannot be tolerated. Many orders are lost by companies who have put clients in long waiting queues or subjected them to long waiting periods for multimedia responses. Such clients often become annoyed, perhaps searching for a suitable competitor who can meet their needs in a timely manner.

Brief Summary Text (12):

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L7: Entry 29 of 33

File: USPT

May 2, 2000

DOCUMENT-IDENTIFIER: US 6058435 A

TITLE: Apparatus and methods for responding to multimedia communications based on content analysis

Abstract Text (1):

A routing method for an information distribution system, such as an automatic communications distribution system, allows substantial content freedom in the formulation of a message to the system. The messages are converted to a computer-searchable format and are subjected to content analysis to identify skills advantageous to responding to the messages. In one application, the incoming message is a facsimile transmission that is converted to computer-generated text information using an optical character recognition module. The freeform incoming message may also be a voice mail message converted using speech recognition techniques, or may be a video transmission, electronic mail or a Webpage referral. In an application of the method and system that includes a response from an

Application Filing Date (1):

19970204

Brief Summary Text (7):

In its simplest form, the incoming calls have little variation and can be handled equally well by any of the ACD agents. The selection of an agent to handle the next incoming call may then take a longest-idle-agent approach, which directs the calls based upon the idle times of the agents. However, in many call center environments, the agents are not equally adept at performing all types of transactions. For example, in a product support facility, different agents may be responsible for handling calls regarding different classes of products, e.g., a first group is knowledgeable with respect to a word processing program, a second group is knowledgeable with respect to a database program, and a third group is knowledgeable with respect to a spreadsheet program. Even within a specific group, there may be a need for individuals to possess different call-handling skills, e.g., agents within the same group who speak different languages. "Specialists" within the call center are important if the center is to have a sufficiently high level of transactional throughput without training all of the agents to be knowledgeable in all areas.

Brief Summary Text (8):

Thus, while the traditional call routing approach works well for environments in which all agents are equally well qualified and all of the calls are similar, the approach may be inadequate in other applications. Siemens Corp. has developed a skills-based routing approach for such applications. A call is routed to one of the agents based upon a correlation of the attributes of the agent with identified skills that are advantageous to efficiently processing the call. That is, for each call that is to be distributed, skills that are relevant to efficient handling of the call are identified and then used to route the call to an appropriate agent. Stored "resumes" of the agents quantify how well the agents are qualified with respect to meeting different requirements of calls. For example, a skills expression of a particular agent may identify a skill level from 0 to 9 for each of 250 different skills. The skills-based routing may also consider preferences of the

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L7: Entry 14 of 33

File: USPT

Dec 17, 2002

DOCUMENT-IDENTIFIER: US 6496580 B1

TITLE: Method and apparatus for servicing queued requests

Abstract Text (1):

Methods for servicing queued requests include the step of queueing at least one request for an initial wait time until at least one agent is available for accepting the queued request. A delay element is provided so that assignment of the queued request is delayed for a delay time. The queued request is then assigned to an available agent. In one embodiment, the delay time is a pre-determined availability pendency time independent of the initial wait time. In another embodiment the request is delayed until a pre-determined queue time has elapsed. In another embodiment, the request may be delayed up to a pre-determined availability pendency time as long as a pre-determined queue time is not exceeded. The delay element need not change the queue discipline. Various queue disciplines including first-in-first-out (FIFO), group FIFO, and modified group FIFO are described for a queueing mechanism incorporating a delay element. The queued requests may represent requests for service to respond to any of a variety of sources including electronic mail communications, facsimile communications, internet communications, telephone communications, etc. In one embodiment, the methods are implemented by an automated call distributor.

Application Filing Date (1):

19990603

Brief Summary Text (12):

The queued requests may represent requests for service to respond to any of a variety of sources including electronic mail communications, facsimile communications, internet communications, telephone communications, etc. In one embodiment, the methods are implemented by an automated call distributor.

Detailed Description Text (2):

FIG. 1 illustrates a general transaction processing system 100. The transaction processing system 100 enables transaction initiators (e.g., customers/requestors) to be paired with an agent for service using various types of transactions. Exemplary types of transactions include telephone calls, facsimile transmissions, electronic mail, video sessions, or network sessions (e.g., an Internet session). Transaction processing system 100 also permits agents to respond to received requests or to initiate a transaction.

Detailed Description Text (5):

Server 120 can operate as a web server, an electronic mail server, a facsimile server, or a video server. In one embodiment, server 120 handles mixed transaction types. In an alternative embodiment, multiple servers are provided such that each is dedicated to one or more types of transaction. For example, an electronic mail server processes transactions conducted by electronic mail. A web server might process all web-based transactions.

Detailed Description Text (7):

Some customers/requestors may access the transaction processing system using

Internet 150. Customer/requestor 158 can use an Internet telephone to establish contact with an agent using Internet 150. Alternatively customer/requestor 158 could use electronic mail.

Detailed Description Text (8):

Customer/requestor 154 may communicate with an agent using Internet 150 (e.g., Internet telephone or electronic mail), a telephone 154, or facsimile equipment 156, or some combination of these.

Detailed Description Text (9):

For example, customer/requestor 154 may generate an electronic mail message to server 120 using Internet 150. Server 120 communicates the electronic mail message to transaction processing system 100 across communication link 122. Transaction processing system 100 then handles routing the electronic mail message to the appropriate agent or group of agents for response. The agents may be grouped based on area of expertise (e.g., particular product line), company department, type of support (e.g., sales or technical support). The agent assigned to handle the electronic mail message can respond by another electronic mail message or by telephone, facsimile, or any other type of transaction supported by the transaction processing system and the customer/requestor. In some embodiments, the transaction initiator may request a type of transaction for the agent to use.

Detailed Description Text (19):

Skills-based routing may be used to improve the match between requests and the agents assigned to handle the requests especially if additional information about the request is available at the time the assignment decision is made. The request is assigned to an agent based at least in part on information associated explicitly or inferentially with the request. In one embodiment, database 162 of FIG. 1 provides additional information regarding the request to facilitate skills-based routing.

Detailed Description Text (21):

Alternatively, the ANI can be used to infer particular characteristics about the caller. For example, calls originating from a particular geographic region may often be conducted in another language. Thus database 162 may be used to associate call requests from a particular geographic region with a specific language. The transaction processing system then attempts to assign the call to an agent that has the ability to speak that language.

Detailed Description Text (24):

In a sales environment, an agent assigned to represent the caller's geographic area may be better suited to handle the request than an agent unfamiliar with the area. To minimize the caller's queue time and provide skills-based routing, the caller may be assigned to the first agent capable of handling that geographic area. If more than one capable agent is available the call may be routed to a presently available agent consistent with the rules designed to balance call loading across agents.

Detailed Description Text (40):

The methods of FIGS. 3-5 can be used to enable better skills matching in a modified FIFO queue discipline. A FIFO queue with skills-based routing might consider the "best" fit between available servers and a currently selected transaction on a transaction-by-transaction basis without consideration to pending subsequent transactions.

CLAIMS:

6. The method of claim 1 wherein the request is a selected one of a voice telephone call, electronic mail message, facsimile transmission, and an internet communication.

10. The method of claim 8 wherein the queued request is a selected one of a voice telephone communication, electronic mail communication, facsimile transmission, and an internet communication.

14. The method of claim 12 wherein the plurality of requests comprise at least a selected one of a voice telephone communication, electronic mail communication, facsimile transmission, and an internet communication.

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L7: Entry 3 of 33

File: PGPB

Nov 22, 2001

DOCUMENT-IDENTIFIER: US 20010043586 A1

TITLE: APPARATUS AND METHODS ENHANCING CALL ROUTING TO AND WITHIN CALL-CENTERS

Application Filing Date:19971009Detail Description Paragraph:

[0038] In some embodiments of the present invention to be described in enabling detail below, agents at agent stations interact verbally with clients via the telephones at the workstations, and the PCNVDUs are utilized for such as screen pops with information about clients, scripts for agents to follow in aiding clients, and technical information and other data needed in interacting with clients. In other embodiments the PCNVDU equipment may be used more comprehensively, such as for video-conferencing with clients, receiving, storing and responding to electronic documents such as e-mail, and for Internet protocol telephony (IPT). In the case of Internet-based and related services, the CTI processor, or any other processor connected to the LAN at a call center may be Internet-connected, and provided with the necessary hardware and software known in the art for providing Internet access to agent's PCNVDUs also connected on the LAN at the call center.

Detail Description Paragraph:

[0041] One of the variables in routing incoming calls, whether in INT or IPNT, is the skill set of each agent assigned to a workstation. This skill set may include a unique set of skills, resources and knowledge, such as, but not limited to, language capability, access to technical information, and specific training. In routing calls in a conventional system both at the network and at the call center level, the system and/or network needs to know such things as the status of any or all call centers, the availability of each agent, the skill set of each agent, the number of incoming calls, the number of calls waiting to be answered, and so forth. In a system using Internet protocol telephony for access to agents at call centers the same kinds of information needs to be available, and there needs to be also a way to route IPNT calls based on the information.

Detail Description Paragraph:

[0048] An Intelligent Peripheral 102 is provided in this example coupled to SCP 101, and its function is to provide initial processing of incoming calls. This initial processing may be done by voice recognition, eliciting information from a caller such as type of product and model number, language preference for communication with an agent, and much more, depending on the nature of the service provided by the organization providing the call centers.

Detail Description Paragraph:

[0063] Routing in this embodiment is typically based on (i) the skills set of the agent (ii) information relating to the calling party, (iii) activities of the call center, and (iiii) legal or other authorization held by an agent. Examples of the skills set of the agent are language, product knowledge, and the like. Examples of calling party information are products purchased, geographical location and the like. Examples of call center activities are number of available agents, calls previously handles by an agent, and the like.

Detail Description Paragraph:

[0068] It will be apparent to those with skill in the art that the invention described with reference to FIGS. 2A and 2B is not limited to monitoring only system and component faults. It has broader application. For example, algorithms may be stored for operating according to load level. Other algorithms may be selected according to specific times-of-day, and such algorithms may be selected based on the time window in a 24-hour period. As another example, algorithms may be stored and selectable based on days of the week. Still other algorithms might be prepared to be accessed with introduction of new products and the like. Statistics may be tracked relative to the percentage of agents free, for example, and a routing algorithm may be accessed for the situation wherein 90% of agents are busy, routing calls only to the next free agent rather than following a skill-based routing algorithm. The invention in this embodiment allows routing algorithms to be selected and executed based upon a very broad congruence of circumstances, so that a call center may be operated at best efficiency even as circumstances alter rapidly, including circumstances of hardware and software functionality, as described in specific embodiments above.

Detail Description Paragraph:

[0090] In the instant embodiment of the invention, which is exemplary only, initial processing is used incorporating IP 102 to elicit information from a customer. This may be done preferably by recorded query and voice recognition. In such a system a call is answered, and a menu system is used to categorize the caller and to elicit and record sufficient information to enable routing (as described above) and hopefully to correlate a customer with an existing database. By recording is meant enrolling the nature of the responses in some form, not necessarily by voice recording. For example, a typical initial processing transaction involves a recorded query to the caller such as "Do you prefer Spanish or English". In some locales the query might be phrased in a language other than English. The caller is requested to respond typically by selecting a key on the touch-tone pad of his/her telephone. In many instances now as well, voice recognition is built into the initial processing machine intelligence, and the customer is instructed in verbal response, such as: "Say Yes or No". The IP in this case recognizes the response and codes data accordingly.

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L7: Entry 7 of 33

File: USPT

Jul 13, 2004

DOCUMENT-IDENTIFIER: US 6763104 B1

TITLE: Call center IVR and ACD scripting method and graphical user interface

Application Filing Date (1):20000224Detailed Description Text (2):

The system and method of the present invention is a PC-based and PBX integrated call center system, which maximizes the use of internal call center resources. FIG. 1 illustrates the basic components of the call center system of the present invention. As will be explained in greater detail below, the system combines an Automatic Call Distributor (ACD), a computer telephony interface (CTI), an Interactive Voice Response (IVR) system and support applications and features onto a single communications platform. The system uses skills-based routing and other intelligent queuing features to ensure that customers are reaching the best skilled and longest available resource within the call center environment. The system minimizes the number of interfaces required to incorporate and manage the call center system. It uses a client/server architecture that can leverage existing data communications networks and commercially available hardware and software components. The system combines software and a modular design incorporated within a highly scalable client/server architecture.

Detailed Description Text (3):

As shown in FIG. 1, the call center system 100 works in conjunction with a switching platform 102, which in one aspect of the present invention, could be a 20-20 switch as manufactured by Harris Corporation of Melbourne, Fla. The switching platform 102 is connected to a public switched telephone network 104 and customer 106. The call center system 100 includes an Interactive Voice Response (IVR) server 108, which also doubles as a call logger/recorder. An Automated Call Distributor (ACD) server 110 includes an ACD manager application and also acts as a call center server administrator. It is connected via TCP/IP links 112, in one aspect of the invention, to individual agent workstations 114, the IVR server 108, and a call center supervisor 116 with a teleset. The IVR server 108 has bidirectional communication with the switching platform 102 and ACD server 110. A Structured Query Language based (SQL) database server 118 is connected (with historical database 120) to ACD server 110 and IVR server 108 via TCP/IP link connection 112. Naturally, the server 118 could work as an ACD server because it also is a Windows NT server, as is server 110. The dashed line indicates the close association among the various servers and applications.

Detailed Description Text (54):

Data can be entered and updated with a Structured Query Language (SQL), which works as an interface to access data on the database system, and includes object-oriented technology, as known to those skilled in the art. In the client/server environment, the user's front-end application interfaces to a database management system with a typical back-end server. The call center system 100 of the present invention has the SQL server 118 (FIG. 1), which allocates space for a database on a hard drive. Memory allocation can be changed and the number of user connections changed also.

Detailed Description Text (62):

The ACD software is operative with the ACD server 110. The ACC server. 110 is operative with the call center system to allow skills-based routing and routing to the longest available (idle) agent. Priority routing can be through various configuration operations with look-ahead routing and web-enabled call center. Skill-based routing allows a customer to be routed to the best available agent to handle the call. The ACD calls can be delivered based on agent skill and call priority.

Detailed Description Text (64):

An incoming call can be routed to the agent who has the highest proficiency and the skill required for that call. If there is more than one agent who equally qualifies, then the agent that has been available the longest time can take the call. Agents can be available to take calls for several skills at the same time. For example, an agent who speaks both English and Spanish can be available simultaneously to take a call requiring either language.

Detailed Description Text (67):

The ACD Manager 130 of the present call center system can be linked to a business, corporate website to allow customers to access the call center through various multi-media options. Using e-mail or call me buttons within a business website, customers can queue inquiries to agents that can, in turn, respond in a manner similar to that of a voice call. Reports and charts can be printed from the web browser and reports can be built.

Detailed Description Text (221):

Because the IVR software interface of the present invention uses a dynamic scripting language, variables do not have a defined type. When a variable is referenced as a string, it is treated as a string. Variables which are referenced as numbers are treated as such. Any time a variable is created, two values are stored internally. One is the string value and the other is the numeric value. Numbers are all stored as extended floating point values. Therefore, any computations will maintain a high degree of precision. When a number is converted to a string, the conversion uses the minimum number of digits to represent the value. Dates and times can be stored as numbers where the data is a whole integer number representing the number of days since Dec. 31, 1999. Time is stored as a fraction of a day. A few special variable names can be reserved, such as DATE and TIME, for current data and time. Another example includes TIME STAMP, which returns the current date and time.

Detailed Description Text (250):

E-MAIL--Sends an e-mail message with an optional file attachment.

Detailed Description Text (268):

The present invention also provides for an integrated voice mail option that provides features and functionality comparable to external Voice Mail Systems (VMS). The embedded nature of this type of system helps to minimize the integration efforts required to implement feature-rich functionality in a complex call center environment. Call recording uses the same platform as the IVR. It also allows supervisors and business entities to record calls for quality monitoring, legal or security purposes. Calls can be recorded based on system-wide, random, scheduled or individual requirements. Supervisors and agents can review calls that are recorded and stored in sound file formats (.wav and .vox). This type of storage medium allows for voice compression to minimize file size, file archives that can be saved onto disk or remotely, and files that can be distributed individually via mediums (e.g., e-mail) for review at a sound-enabled desktop PC or workstation.

Detailed Description Paragraph Table (27):

Parameters: Address The e-mail address of the recipient. Follow standard Internet e-mail format (e.g., name@domain.com). Subject Enter the text to be sent as the subject of the message. Attachment Optional. Enter the filename of the attachment

to be sent with the e-mail. Body Enter the body text of the e-mail message.
Results: Failure Specifies a destination to branch to if the data pipe service
could not be connected to.

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Preferences Entry 11 of 33 File: USPT Jul 1, 2003
Logout

DOCUMENT-IDENTIFIER: US 6587556 B1
TITLE: Skills based routing method and system for call center

Application Filing Date (1):
20000225

Brief Summary Text (12):

The method can also comprise the step of selecting a standard action tab for displaying script icons representative of one of at least (a) starting an IVR script, (b) capturing a dual tone multi-frequency (DTMF) digits, (c) playing sound files, (d) playing voice prompts, (e) evaluating an expression and branching a call flow direction based on the evaluation, (f) defining of branch nodes, (g) recording of speech, (h) terminating a script, and (i) dialing digits through a phone system. An advanced action tab can also be selected for displaying script icons representative of at least one of (a) transferring a call, (b) combining actions, (c) assigning the results of an expression to a variable, (d) executing a previously saved IVR script, (e) sending an external DLL hook routing, (f) sending data to an external program via a data pipe, (g) sending an e-mail message, and (h) and sending a message to a pager.

Detailed Description Text (2):

The system and method of the present invention is a PC-based and PBX integrated call center system, which maximizes the use of internal call center resources. FIG. 1 illustrates the basic components of the call center system of the present invention. As will be explained in greater detail below, the system combines an Automatic Call Distributor (ACD), a computer telephony interface (CTI), an Interactive Voice Response (IVR) system and support applications and features onto a single communications platform. The system uses skills-based routing and other intelligent queuing features to ensure that customers are reaching the best skilled and longest available resource within the call center environment. The system minimizes the number of interfaces required to incorporate and manage the call center system. It uses a client/server architecture that can leverage existing data communications networks and commercially available hardware and software components. The system combines software and a modular design incorporated within a highly scalable client/server architecture.

Detailed Description Text (3):

As shown in FIG. 1, the call center system 100 works in conjunction with a switching platform 102, which in one aspect of the present invention, could be a 20-20 switch as manufactured by Harris Corporation of Melbourne, Fla. The switching platform 102 is connected to a public switched telephone network 104 and customer 106. The call center system 100 includes an Interactive Voice Response (IVR) server 108, which also doubles as a call logger/recorder. An Automated Call Distributor (ACD) server 110 includes an ACD manager application and also acts as a call center server administrator. It is connected via TCP/IP links 112, in one aspect of the invention, to individual agent workstations 114, the IVR server 108, and a call center supervisor 116 with a teleset. The IVR server 108 has bidirectional communication with the switching platform 102 and ACD server 110. A Structured Query Language based (SQL) database server 118 is connected (with historical

database 120) to ACD server 110 and IVR server 108 via TCP/IP link connection 112. Naturally, the server 118 could work as an ACD server because it also is a Windows NT server, as is server 110. The dashed line indicates the close association among the various servers and applications.

Detailed Description Text (48):

Data can be entered and updated with a Structured Query Language (SQL), which works as an interface to access data on the database system, and includes object-oriented technology, as known to those skilled in the art. In the client/server environment, the user's front-end application interfaces to a database management system with a typical back-end server. The call center system 100 of the present invention has the SQL server 118 (FIG. 1), which allocates space for a database on a hard drive. Memory allocation can be changed and the number of user connections changed also.

Detailed Description Text (56):

The ACD software is operative with the ACD server 110. The ACD server 110 is operative with the call center system to allow skills-based routing and routing to the longest available (idle) agent. Priority routing can be through various configuration operations with look-ahead routing and web-enabled call center. Skill-based routing allows a customer to be routed to the best available agent to handle the call. The ACD calls can be delivered based on agent skill and call priority.

Detailed Description Text (58):

An incoming call can be routed to the agent who has the highest proficiency and the skill required for that call. If there is more than one agent who equally qualifies, then the agent that has been available the longest time can take the call. Agents can be available to take calls for several skills at the same time. For example, an agent who speaks both English and Spanish can be available simultaneously to take a call requiring either language.

Detailed Description Text (61):

The ACD Manager 130 of the present call center system can be linked to a business' corporate website to allow customers to access the call center through various multi-media options. Using e-mail or call me buttons within a business website, customers can queue inquiries to agents that can, in turn, respond in a manner similar to that of a voice call. Reports and charts can be printed from the web browser and reports can be built.

Detailed Description Text (216):

Because the IVR software interface of the present invention uses a dynamic scripting language, variables do not have a defined type. When a variable is referenced as a string, it is treated as a string. Variables which are referenced as numbers are treated as such. Any time a variable is created, two values are stored internally. One is the string value and the other is the numeric value. Numbers are all stored as extended floating point values. Therefore, any computations will maintain a high degree of precision. When a number is converted to a string, the conversion uses the minimum-number of digits to represent the value. Dates and times can be stored as numbers where the data is a whole integer number representing the number of days since Dec. 31, 1999. Time is stored as a fraction of a day. A few special variable names can be reserved, such as DATE and TIME, for current data and time. Another example includes TIME STAMP, which returns the current date and time.

Detailed Description Text (248):

E-MAIL--Sends an e-mail message with an optional file attachment.

Detailed Description Text (273):

The present invention also provides for an integrated voice mail option that provides features and functionality comparable to external Voice Mail Systems

(VMS). The embedded nature of this type of system helps to minimize the integration efforts required to implement feature-rich functionality in a complex call center environment. Call recording uses the same platform as the IVR. It also allows supervisors and business entities to record calls for quality monitoring, legal or security purposes. Calls can be recorded based on system-wide, random, scheduled or individual requirements. Supervisors and agents can review calls that are recorded and stored in sound file formats (.wav and vox). This type of storage medium allows for voice compression to minimize file size, file archives that can be saved onto disk or remotely, and files that can be distributed individually via mediums (e.g., e-mail) for review at a sound-enabled desktop PC or workstation.

Detailed Description Paragraph Table (28):

Parameters: Address The e-mail address of the recipient. Follow standard Internet e-mail format (e.g., name@domain.com). Subject Enter the text to be sent as the subject of the message. Attachment Optional. Enter the filename of the attachment to be sent with the e-mail. Body Enter the body text of the e-mail message.

Results: Failure Specifies a destination to branch to if the data pipe service could not be connected to.

CLAIMS:

15. A method according to claim 13, claim and further comprising the step of selecting an advanced action tab for displaying script icons representative of at least one of (a) transferring a call, (b) combining actions, (c) assigning the results of an expression to a variable, (d) executing a previously saved IVR script, (e) sending an external DLL hook routing, (f) sending data to an external program via a data pipe, (g) sending an e-mail message, and (h) and sending a message to a pager.

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